DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application]It is connected via the interface which supported two or more kinds of emulations and in which a printer and two-way communication are possible, and this invention relates to the printer used for the information processing system with which the application program can operate, and its information processing system.

[0002]

[Description of the Prior Art]Although there are various kinds of the printers (printer) connected to hosts, such as a personal computer, the actual condition is that the control commands (an emulation is called hereafter) of these printers differ depending on the model. The conventional printer supported only one emulation, but such a printer especially was used in many cases, having been connected to the host and the couple 1. The host side corresponded with one of two kinds of methods which shows below, in order to correspond to the emulation which is supporting the connected printer. First, the application program itself is the method of outputting the control commands corresponding to a printer by setting up the print environment of an application program beforehand as the 1st method based on the kind of printer connected to the host. And it is the method of exchanging for the thing corresponding to the kind of a printer driver with the function which carries out data conversion of the print data which comprised a format original with an application program as the 2nd method to a specific emulation, and printer which outputs a called program.

[0003]However, recent years come and the environment which two or more hosts and two or more printers are connected via a network, and is used has become common. The situation where two or more hosts share one set of a printer by this has occurred. The emulation of the print data which a host outputs on the other hand is various, Only by the printer connected to a network environment which was mentioned above supporting only one emulation like before, since the problem to which user-friendliness gets very bad has actualized, the printer which supports two or more kinds of emulation functions has appeared.

[0004]In such a printer, one emulation program is always chosen and executed out of two or more emulations currently supported, and print data are processed. By the way, various methods are taken by the selection method of the emulation. For example, a method of analyzing about tens of bytes of the beginning of transmitted print data, specifying the kind of emulation of print data, and changing automatically, Or the command which can specify the emulation from which the host side constitutes data at the time of transmission of print data is added, and a printer has the way this command performs an emulation change etc.

[0005]Although the former has an advantage which can perform an emulation change

automatically, when the judgment of the emulation of the similar command system is mistaken on the other hand in many cases and exact emulation selection is not performed, the fault from which a right printed result is not obtained occurs. In that respect, in the latter method, an exact emulation change is possible and the fault of printing is not generated.

[0006]

[Problem(s) to be Solved by the Invention]However, in the latter method, if an emulation switching command is transmitted from the host side when transmitting print data each time, The emulation spawn process by the side of a printer and initialization processing accompanying it will be performed, and the problem that printing job speed falls occurs. This invention is made in order to solve the problem mentioned above, and it is a thing.

When transmitting print data to the printer which carries the purpose, it is providing the printer used for the information processing system and it which it is possible to lose the unnecessary emulation spawn process's by the side of a printer, and can raise printing job speed.

[0007]

[Means for Solving the Problem]In order to attain this purpose an information processing system of claim 1, Carry two or more kinds of emulations, and it is connected by emulation change command from the outside via an interface in which a printer and two-way communication in which switching operation of an active emulation is possible are possible, A data conversion means which changes into an emulation corresponding to a printer print data which are the information processing systems with which the application program can operate, and are outputted from an application program, An acquisition means which acquires active emulation information in a printer, A judging means which judges whether an emulation made applicable to conversion by a data conversion means and an active emulation of a printer acquired by an acquisition means are in agreement, An emulation switching command issuing means which publishes an emulation switching command only when judged with two emulations being inharmonious by a judging means, It has a data transfer means which transmits an output from an emulation switching command issuing means, and an output from a data conversion means to a printer. A printer used for an information processing system of claim 2 is provided with a delivery means which sends out active emulation information set up now when an inquiry of an active emulation in a printer is made before transmission of print data.

[0008]

[Function]In the information processing system of claim 1 which has the above-mentioned composition, a data conversion means changes into the emulation corresponding to a specific printer the print data in which the working application program carried out printing directions and which it has outputted. On the other hand, an acquisition means acquires the emulation

information which is active with the printer connected now from a printer. As a result, only when it judges with the active emulation in a printer and the emulation of a judging means of the print data in a data conversion means not corresponding. A data transfer means transmits the switching command to the emulation which is published from an emulation switching command issuing means and which is used for print data to a printer together with print data in advance of print-data transmission. Therefore, it becomes possible to exclude useless processing of the initialization processing accompanying an unnecessary emulation change, etc. by the printer side. In the printer used for the information processing system of claim 1 of claim 2, a delivery means answers to the inquiry of the active emulation set as the printer made before print data are transmitted. Thereby, said acquisition means acquires emulation information and the above-mentioned information processing system performs the above-mentioned operation.

[0009]

[Example]Hereafter, one example which materialized this invention is described with reference to drawings. Drawing 1 is a block diagram showing the information processing system 3 included the information processor 1 by this example, and the printer (printer) 2 which performs a printing job. The information processor 1 functions as a host computer among a figure, and the central processing unit (CPU) 4 manages control of the whole. ROM5 has memorized the character pattern corresponding to the control program and the various character codes of CPU4, etc. RAM6 carries out the temporary storage of the data, or it loads a program. And the keyboard 8 and the external storage 9 for inputting ROM5, RAM6, CRT display 7, and a variety of information are connected to CPU4 via the bus line. The application program P1 with which the external storage 9 operates with the information processor 1, A print manager program which performs spooling, printing controlling, etc. of print data at the time of printing execution. (It is only hereafter called a print manager) Change P2 and the print data from the application program P1 into an emulation program, or, They are the printer driver program (only henceforth a printer driver) P3 which has a function which acquires the state of the connected printer, the device driver program (only henceforth a device driver) P4 which controls transmission of print data, and a storage which stores various data.

For example, they are a hard disk, CD-ROM, etc.

The information processor 1 is connected with the printer 2 via the external-interface control section 10 and the bidirectional interface 19.

[0010]Drawing 2 is a block diagram showing the example composition of the printer 2 used with the information processing system 3 of this invention. As the printer 2 used by this invention, there are a laser beam printer, an ink-jet printer, etc. The central processing unit (CPU) 11 with which the printer 2 manages control of the whole printer, The information processor 1 12, i.e., the host interface control part which transmits and receives data in both

directions between host computers, ROM13 which stores the program which specified control of CPU11, control of the whole printer, and operation, RAM14 for loading various emulation programs or storing the work or data at the time of program execution, The engine interface 15 which performs the status between the engines 18, and an exchange of printing data, It has font ROM17 which stored the panel 16, the shape of Hollerith type, a dictionary for displaying the error situation and state of the printer 2, or performing various setting out of interface selection, paper size selection, etc., etc. The program which specifies the operation of the emulation E1 of three kinds of printers, E2, and E3 other than the control program of the printer 2 which was mentioned above in ROM13, for example, and the program E0 which chooses one emulation from these emulations are memorized. An emulation change program is changed by specifying the selection method of an emulation by the panel 16, or the emulation switching command from the information processor 1.

[0011]Next, the operation outline of the printing job in the information processing system 3 of this example constituted in this way is explained using drawing 3. Drawing 3 is a flow chart which shows the printing job process in this example. One or two or more application programs P1 which are stored in the external storage 9 are loaded and executed by RAM6 of the information processor 1. When a printing demand is advanced from these one, the print data are passed to the print manager P2 via the operating system (not shown) stored in ROM5 of this information processor 1, or the external storage 9 (S1). The print data over the print manager P2, By the data conversion feature (data conversion means) of the printer driver P3, it is changed into the emulation which the printer 2 interprets, and the changed print data are held at the external storage 9, and the print manager P2 once manages them (S2). Although the print manager P2 (transfer means) transmits these print data to the printer 7 via the bidirectional interface 19 controlled by the host interface control part 12 using the device driver P4, In advance of it, the print manager P2 establishes connection between this information processor 1 and the printer 2 (S3). That is, in order to change print data into the state which can be transmitted to the printer 2 via the bidirectional interface 19 from the information processor 1, initialization, transfer condition setting out, etc. of a bidirectional interface control device are performed.

[0012]As the connection establishment method of the bidirectional interface 19 as shown in this example, the connection-confirm command specified beforehand is transmitted to the printer 2 from the information processor 1 side, and the method of checking the response of the printer 2 to this, etc. are taken. After connection is checked, the print manager P2 asks the error status of the printer 2 (S4). Error status is in the state where the printers 2, such as a paper piece and a paper jam, cannot perform a printing job, for example. Here, when the error of the printer 2 is detected, error release processing is urged to (S6) and an operator by displaying YES), error information, the treating method for it, etc. on CRT display 7 by (S5.

Next, after being able to check that the printer 2 has been in the printing possible state (it is NO at S5), the print manager P2 asks the emulation information by which the present selection (setting out) is made with the printer 2 (S7). (acquisition) At this time, in the printer 2, it investigates what the emulation set up is and the kind of that emulation is sent out to the information processor 1 via the bidirectional interface 19. [0013]It is judged whether the printer emulation which is the conversion target of the printer driver P3 chosen now, and the active emulation set as the present printer 2 are in agreement to the response of the printer 2 to this inquiry (S8). As a result of judging, when two emulations are not in agreement (it is NO at S8), an emulation switching command is published before transmission of printing data, and it transmits to it at the printer 2 (S9). Then, all the print data are transmitted to the printer 2 one by one (S10). On the other hand, when it is judged that two emulations are in agreement by S8, transmission of YES) and an emulation switching command is not performed by (S8, but all the print data are transmitted to the printer 2 one by one (S10). Issue of acquisition of the emulation information of the above S7, the judgment of the emulation of S8, and the emulation switching command of S9 is performed by processing of CPU4, and CPU4 is equivalent to these function means.

[0014]Next, the processing operation by the side of the printer 2 is explained with reference to drawing 4. Here, emulation switching operation in case the emulation under present execution is the emulation E1 with the printer 2 and the data transmitted to the next is the emulation E2 as an example is explained. In the printer 2, the data received from the information processor 1 is once stored in the receive buffer in which it was provided by RAM14. The data analysis part of the emulation E1 performs reading processing for input data one by one from said receive buffer (S21, S23). If said data analysis part detects the switching command of an emulation in the data acquired from the receive buffer (it is YES at S22), When it judges whether the print task under processing exists (S24) and the print task under processing already exists (it is YES at S24), this task is processed, and printing discharge is carried out, or it processes canceling a task etc. (S25). The following processings are performed in order to perform the spawn process of an emulation, when processing of the existing task is completed (it is NO at S24), or when a print task does not exist during the present processing.

[0015]First, what the emulation E1 can eliminate in the work memory and data which are used is chosen and canceled. The change to resources which are between different emulations and are being shared is returned, or end processing of an emulation, such as correction of the management information of these resources, is performed (S26). Subsequently, the emulation selection program E0, Reading from ROM13 the emulation E2 which is a new emulation specified by the emulation switching command sent from the information processor 1, the emulation E2 performs initialization processing for its operating environment maintenance (S27). That is, initialization of a parameter, reservation of a work area, a check of the existing

resources, etc. which the emulation E2 uses are performed. The emulation E2 is performed after the end of initialization processing (S28), and the printer 2 starts print operation according to this. The data analysis part of the emulation E2 takes out printing data from the receive buffer of RAM14 one by one, and performs a printing job (S21, S23).

[0016]According to the printer 2 used for the information processing system 3 and it by the above-mentioned example. The printer 2 carries two or more emulation functions, detect the emulation to which the printer 2 is active when printing, and This detected emulation, Since he is trying to transmit an emulation switching command only when the emulation which is trying to send print data from now on is not in agreement, performing an unnecessary emulation spawn process in the printer 2 is lost, and printing job speed increases.

[0017]Various modification is possible for this invention, without being restricted to the above-mentioned example composition, for example, the external storage 9 which stored various programs may be replaced with it, and an internal memory means may be used for it. Also when two or more information processors 1 are connected to the one printer 2, of course, it can apply.

[0018]

[Effect of the Invention]According to the printer used for the information processing system which starts the information processing system concerning claim 1, and claim 2 like [it is ****** and] from having explained above. When printing with the printer which carries two or more emulation functions, with a printer, detect the emulation which is active now and This detected emulation, Since he is trying to transmit an emulation switching command only when the emulation which is trying to send print data from now on is not in agreement, performing an unnecessary emulation spawn process with a printer is lost, and improvement in printing job speed can be aimed at.

[Translation done.]